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PALISADES GEOPHYSICAL INST FPO NEW YORK 09560  
OCEAN SOUND TRANSMISSION. (U)  
SEP 80 F WATLINGTON

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⑨ FINAL REPORT

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OCEAN SOUND TRANSMISSION

Research carried out at  
Palisades SOFAR Station  
St. David's, Bermuda

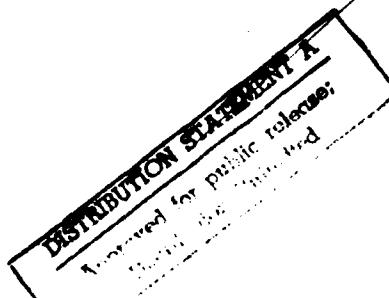
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Report written by

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Palisades Geophysical Institute

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This was an acoustic monitoring system sensitive to transient signals occurring principally in the Atlantic Ocean; however, signals have been received on it originating near Perth Australia the antipodal point to Bermuda. This system operated for more than 30 years with the collection of some valuable data.

Two recording methods were utilized, (1) a system of drums yielding hard copy paper recordings, and (2) magnetic tape on  $\frac{1}{2}$  inch reels.

Four drums were used six inches in diameter rotating three times per hour and changed daily giving a 24 hour record. Sanborn electronic equipment was used to drive pen-motors containing hot wire pens. The paper contained a white wax surface which was burned away by the hot wire pens leaving a black trace of the hydrophone signals. The paper records were filed permanently for examination when required. Figures 1-5.

The magnetic recorder was an Ampex having a tape speed of 15/16" per second yielding a 24 hour record on one reel. This record was kept for one month then if it contained nothing of interest it was wiped clean and reused.

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Two of the drums recorded signals through 41 Hz low pass filters and the other two drums recorded signals which traveled through log-audio amplifiers so that they would be responsive to signals above the 100 cycle cut-off frequency of the pen-motors. The magnetic records were on a seven channel tape and contained two direct channels and two FM channels, time marks were recorded on two other channels and there was one spare.

One minute time marks were recorded on the drums and a high school student was generally employed to change the records daily. He would also mark on the paper records the date the starting time and the finishing time. An hour break was included to facilitate record reading.

The hydrophones were located off the NUSC Tudor Hill Laboratories.

The initiation of this monitoring service began in about the year 1950 and has been most valuable, used with many Office of Naval Research (ONR) projects since that time. A similar system was installed in the Canary Islands on the island of La Palma and used to record splashes during missile accuracy tests on that side of the Atlantic. When the USS Scorpion, the nuclear submarine, was lost in the Mid-Atlantic the transient signals produced by imploding compartments were recorded on these recording systems and eventually provided sufficient data to locate the sunk ship. Important seismic T-Phase signal work was accomplished

by Dr. Maurice Ewing, then at Columbia University; the T-Phase signal is the acoustic signal originating from seismic activity in the West Indies and along the Mid-Atlantic ridge...but traveling by water. This data was correlated with the seismic signal arriving by an earth path but received on land at the Sofar Seismograph Station located at Fort George, St. George's, Bermuda.

The long life of this recording system originated from its many uses and because the system was not classified and could be used by the scientific community. It provided a daily picture of transient events received on this side of the Atlantic Ocean.

Much work was done at this Station studying the acoustic sounds from whales that appear in Bermuda during the winter and spring of each year. This Station collaborated with those interested in these sounds and its loss will be a serious interruption of this work. A large library now exists of these paper records and sounds from principally the humpback whale...on magnetic tape. The graphic records have been transferred to Woods Hole Oceanographic Institute.

A few of the normally received signals are included for illustrative purposes shown in Figures 1 to 5.

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